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EXAMINER	
KHAN, USMAN A	

ART UNIT	PAPER NUMBER
2622	

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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No.	Applicant(s)	
	10/784,472	BRADY ET AL.	
	Examiner	Art Unit	
	USMAN KHAN	2622	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE *3* MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *24 June 2009*.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-40* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-40* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *24 February 2004* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☐ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

1. Applicant's arguments filed on 06/24/2009 with respect to claims 1 - 30 and newly added claims 31 - 40 have been considered but are not persuasive.

2. Please refer to the following office action, which clearly sets forth the reasons for non-persuasiveness.

Regarding **claim 30**, Applicant argues that Tanida et al. does not teach "each image blocking portion being smaller than a detector" and "an output of the plurality of detectors together representing an input image multiplied by a selected transform matrix.".

However, the examiner kindly notes that: Tanida et al. teaches that a plurality of filters 4a is located between the array of lenses and the detectors. The plurality of filters 4a can be broken down as each filter 4a including a plurality of polarizing beam splitters; in this method the claimed portion of “each image blocking portion being smaller than a detector" is read by the polarizing beam splitters of 4a. Also, the examiner notes that in column 6, lines 18 – 24 Tanida et al. teaches that all of the signals are obtained from the photosensitive elements by an inverse matrix method. Also, there is no discussion in the specification and the claims of the inverse matrix method occurring at the location of the image blocking portion.

Regarding **claims 1 – 4, 9 – 13, 15 – 19, and 21 - 29**, Applicant argues that there is no motivation to combine Mendlovic et al. with the teachings of Tanida. Also, applicant argues that Mendlovic et al. fails to teach "each sub-pixel| resolution element being smaller than a detector, a pattern of the multiple sub-pixels resolution elements being substantially the same for the plurality of detectors associated with a

corresponding lens." while Mendlovic et al. references may disclose slits being smaller than a detector along one dimension, these slits do not constitute a pattern of sub-pixel resolution elements.

However, the examiner kindly notes that: as discussed in the previous office action Mendlovic et al. teaches in column 2 line 27 – column 3 line 26 that using the CCD configuration of the invention will improve the image quality; and more specifically, in column 2 lines 33 – 37 Mendlovic et al. teaches that the invention will enhance the resolution of the image. Also, in column 2 lines 38 – 39 Mendlovic et al. teaches that the invention will enhance sampled data, and in column 2 line 52 – column 3 line 26 Mendlovic et al. again teaches that the image resolution is enhanced. Also the examiner notes that the sub-pixels of Mendlovic et al. when combined with the primary reference of Tanida et al. the sub pixels will form a pattern layer.

Regarding **claims 24 - 25**, Applicant argues that Heller et al. does not teach in combination with the teachings of Mendlovic et al. and Tanida et al. the limitations of transmitting all incident light.

However, the examiner kindly notes that: as discussed in the previous office action Mendlovic et al. and Tanida et al. teach the limitations of claims 24 – 25, more specifically figure 8 item 4, Tanida et al. teaches that some of the patterns will be transmitting all light through.

Regarding claims 5, 7, 14, 8, 20, and 31 applicant argues that the examiner has not provided a motivation to combine.

However, the examiner points to the motivation paragraph for each of these claims below for the proper motivation as also mentioned in the last office action.

Regarding claim 31 applicant argues that Office action recognizes that the combination of the Tanida and Mendlovic et al. references fails to disclose a lens having no blocking portions, relying on Heller as prodding this missing teaching, the Heller et al. reference may teach using no blocking portion, this is in conjunction with detection of a moving image in which adjacent sensors have different blocking portions. The mask in the Holler et al. reference is associated with a field of view, which requires a detector array, the masks in the Heller et al. reference would not be used with a single detector.

However the examiner notes: That Heller does in fact teach that item A(0) of figure transmits all incoming light through while the A(1) – A(8) block some light, hence the claim limitation is taught.

DETAILED ACTION

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

3. Claims 30, 33, and 34 are rejected under 35 U.S.C. 102(e) as being anticipated by Tanida et al. (US patent No. 7,009,652).

Regarding **claim 30**, Tanida et al. teaches an imaging system (column 2 lines 46 – 58), comprising: an array of lenses (figure 1 item 1 microlens array with plurality of microlenses 1a; also column 3 lines 52 – column 4 line 9); a plurality of detectors for each lens (figure 1 item 3 photosensitive element array with plurality of photosensitive elements 3a; also column 3 lines 52 – column 4 line 9), the detectors being on an image plane of the imaging system (figure 8 item 4 polarizing filter array with plurality of polarizing filters 4a; also column 6 lines 25 – 60); and a corresponding plurality of multiple image blocking portions provided for each detector (figure 8 item 4 polarizing filter array with plurality of polarizing filters 4a; also column 6 lines 25 – 60), each image blocking portion being smaller than a detector (figure 8 item 4 polarizing filter array with plurality of polarizing filters 4a; also column 6 lines 25 – 60), a pattern of multiple image blocking portions being substantially the same for the plurality of detectors associated with a corresponding lens (figure 8 item 4 polarizing filter array with plurality of polarizing filters 4a; also column 6 lines 25 – 60), the plurality of multiple image blocking portions being between the lens and the plurality of detectors (figure 8 item 4 polarizing filter array with plurality of polarizing filters 4a; also column 6 lines 25 – 60), wherein at least two patterns of multiple image blocking portions associated with different lenses are different (figure 8 item 4 polarizing filter array with plurality of polarizing filters 4a; also column 6 lines 25 – 60), an output of the plurality of detectors together representing

an input image multiplied by a selected transform matrix (column 6 line 18 – 24; inverse matrix method and column 3 lines 63 *et seq.* processing unit U).

Regarding **claim 33**, as mentioned above in the discussion of claim 30, Tanida et al. teaches all of the limitations of the parent claim. Additionally, Tanida et al. teaches that each image blocking portion is smaller than a detector in both directions (figure 8 item 4 polarizing filter array with plurality of polarizing filters 4a; also column 6 lines 25 – 60; the plurality of filters 4a can be broken down as each filter 4a including a plurality of polarizing beam splitters).

Regarding **claim 34**, as mentioned above in the discussion of claim 33, Tanida et al. teaches all of the limitations of the parent claim. Additionally, Tanida et al. teaches that each image blocking portion in a pattern has equal dimensions in both directions (figure 8 item 4 polarizing filter array with plurality of polarizing filters 4a; also column 6 lines 25 – 60; the plurality of filters 4a can be broken down as each filter 4a including a plurality of polarizing beam splitters).

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

4. Claims 1 – 4, 6, 9 - 13, 15 – 19, 21 – 29, 36 – 37, and 39 - 40 are rejected under 35 U.S.C. 103(a) as being unpatentable over Tanida et al. (US patent No. 7,009,652) in view of Mendlovic et al. (US patent No. 7,003,177).

Regarding **claim 1**, Tanida et al. teaches an imaging system (column 2 lines 46 – 58), comprising: an array of lenses (figure 1 item 1 microlens array with plurality of microlenses 1a; also column 3 lines 52 – column 4 line 9); a plurality of detectors for each lens (figure 1 item 3 photosensitive element array with plurality of photosensitive elements 3a; also column 3 lines 52 – column 4 line 9), the detectors being on an image plane of the imaging system (figure 1 item 3 photosensitive element array with plurality of photosensitive elements 3a; also column 3 lines 52 – column 4 line 9); and a corresponding plurality of focal plane coding elements (figure 8 item 4 polarizing filter array with plurality of polarizing filters 4a; also column 6 lines 25 – 60), a focal plane coding element provided for each detector each focal plane coding element having multiple pixel resolution elements (figure 8 item 4 polarizing filter array with plurality of polarizing filters 4a; also column 6 lines 25 – 60), each pixel resolution element being smaller than a detector (figure 8 item 4 polarizing filter array with plurality of polarizing filters 4a; also column 6 lines 25 – 60), a pattern of the multiple pixels resolution elements being substantially the same for the plurality of detectors associated with a corresponding lens (figure 8 item 4 polarizing filter array with plurality of polarizing filters 4a; also column 6 lines 25 – 60), the plurality of focal plane coding elements being between the lens and plurality of detectors (figure 8 item 4 polarizing filter array with plurality of polarizing filters 4a; also column 6 lines 25 – 60), wherein at least two of the

focal plane coding elements provided for the plurality of detectors associated with different lenses have different patterns of multiple pixel resolution elements (figure 8 item 4 polarizing filter array with plurality of polarizing filters 4a; also column 6 lines 25 – 60 each of the adjacent items of 4a are polarized in a different direction);

an output of the plurality of detectors together representing an input image multiplied by a selected transform matrix (column 6 line 18 – 24; inverse matrix method and column 3 lines 63 *et seq.* processing unit U).

However, Tanida et al. fails to teach that the pixels are sub-pixels. Mendlovic et al., on the other hand teaches that the pixels are sub-pixels.

More specifically, Mendlovic et al. teaches that that the pixels are sub-pixels (column 2 line 38 – 45, column 6 liens 47 *et seq.*, column 13 lines 3 *et seq.*, and column 14 lines 8 *et seq.*; sub-pixel).

Therefore, one of ordinary skill in the art at the time the invention was made would have been motivated to incorporate the teachings of Mendlovic et al. with the teachings of Tanida et al. because in column 2 line 27 – column 3 line26 Mendlovic et al. teaches that using the CCD configuration of the invention will improve the image quality.

Regarding **claim 2**, as mentioned above in the discussion of claim 1, Tanida et al. in view of Mendlovic et al. teach all of the limitations of the parent claim. Additionally, Tanida et al. teaches that the focal plane-coding element provides pixel shifted multiple images on each sensor pixel (figure 5 and column 6 lines 5 – 17).

However, Tanida et al. fails to teach that the pixels are sub-pixels. Mendlovic et al., on the other hand teaches that the pixels are sub-pixels.

More specifically, Mendlovic et al. teaches that that the pixels are sub-pixels (column 2 line 38 – 45, column 6 liens 47 *et seq.*, column 13 lines 3 *et seq.*, and column 14 lines 8 *et seq.*; sub-pixel).

Therefore, one of ordinary skill in the art at the time the invention was made would have been motivated to incorporate the teachings of Mendlovic et al. with the teachings of Tanida et al. because in column 2 line 27 – column 3 line26 Mendlovic et al. teaches that using the CCD configuration of the invention will improve the image quality.

Regarding **claim 3**, as mentioned above in the discussion of claim 1, Tanida et al. in view of Mendlovic et al. teach all of the limitations of the parent claim. Additionally, Tanida et al. teaches that the focal plane-coding element is an apertured mask (figure 1, item 2 partition wall layer with partition layers 2a).

Regarding **claim 4**, as mentioned above in the discussion of claim 1, Tanida et al. in view of Mendlovic et al. teach all of the limitations of the parent claim. Additionally, Tanida et al. teaches that the imaging system further comprising color filters (column 11 lines 24 – 38).

Regarding **claim 6**, as mentioned above in the discussion of claim 1, Tanida et al. in view of Mendlovic et al. teach all of the limitations of the parent claim. Additionally, Tanida et al. teaches a birefringent structure adjacent the focal plane-coding element (figure 2).

Regarding **claim 9**, as mentioned above in the discussion of claim 1, Tanida et al. in view of Mendlovic et al. teach all of the limitations of the parent claim. Additionally, Tanida et al. teaches at least one sensor pixel receives light from more than one lens of the array of lenses (figure 11, 12A, and 12B).

Regarding **claim 10**, as mentioned above in the discussion of claim 1, Tanida et al. in view of Mendlovic et al. teach all of the limitations of the parent claim. Additionally, Tanida et al. teaches a processor receiving the outputs of the sensor pixels and multiplying the outputs by an inverse of the selected transform matrix (column 6 line 18 – 24; inverse matrix method and column 3 lines 63 *et seq.* processing unit U).

Regarding **claim 11**, as mentioned above in the discussion of claim 10, Tanida et al. in view of Mendlovic et al. teach all of the limitations of the parent claim. Additionally, Tanida et al. teaches that the processor reconstructs an image from the outputs, a number of image pixels in the image being greater than the plurality of sensor pixels (column 2 lines 46 – 58).

Regarding **claim 12**, Tanida et al. teaches an imaging system (column 2 lines 46 – 58), comprising: an array of lenses (figure 1 item 1 microlens array with plurality of microlenses 1a; also column 3 lines 52 – column 4 line 9); a plurality of detectors for each lens (figure 1 item 3 photosensitive element array with plurality of photosensitive elements 3a; also column 3 lines 52 – column 4 line 9); a corresponding plurality of detectors (figure 8 item 4 polarizing filter array with plurality of polarizing filters 4a; also column 6 lines 25 – 60), a filter provided for each detector (figure 8 item 4 polarizing filter array with plurality of polarizing filters 4a; also column 6 lines 25 – 60), each filter having multiple pixel resolution elements (figure 8 item 4 polarizing filter array with plurality of polarizing filters 4a; also column 6 lines 25 – 60), each pixel resolution element being smaller than a detector (figure 8 item 4 polarizing filter array with plurality of polarizing filters 4a; also column 6 lines 25 – 60), a pattern of the multiple pixels resolution elements being substantially the same for the plurality of detectors associated with a corresponding lens (figure 8 item 4 polarizing filter array with plurality of polarizing filters 4a; also column 6 lines 25 – 60), and providing a pixel shifted multiple image on each sensor pixel (figure 8 item 4 polarizing filter array with plurality of polarizing filters 4a; also column 6 lines 25 – 60); and a processor receiving outputs from each detector and reconstructing an image (column 6 line 18 – 24; inverse matrix method and column 3 lines 63 *et seq.* processing unit U), together representing an input image multiplied by a selected transform matrix (column 6 line 18 – 24; inverse matrix method and column 3 lines 63 *et seq.* processing unit U), a number of image pixels in the image being greater than the plurality of detectors (column 2 lines 46 – 58).

However, Tanida et al. fails to teach that the pixels are sub-pixels. Mendlovic et al., on the other hand teaches that the pixels are sub-pixels.

More specifically, Mendlovic et al. teaches that that the pixels are sub-pixels (column 2 line 38 – 45, column 6 liens 47 *et seq.*, column 13 lines 3 *et seq.*, and column 14 lines 8 *et seq.*; sub-pixel).

Therefore, one of ordinary skill in the art at the time the invention was made would have been motivated to incorporate the teachings of Mendlovic et al. with the teachings of Tanida et al. because in column 2 line 27 – column 3 line26 Mendlovic et al. teaches that using the CCD configuration of the invention will improve the image quality.

Regarding **claim 13**, as mentioned above in the discussion of claim 12, Tanida et al. in view of Mendlovic et al. teach all of the limitations of the parent claim. Additionally, Tanida et al. teaches a birefringent structure plurality of filters ((column 2 lines 46 – 58; also [figure 8 item 4 polarizing filter array with plurality of polarizing filters 4a; also, column 6 lines 25 – 60] and/or [figure 15 item 7 diffraction grating; also column 10 lines 57 *et seq.*]).

Regarding **claim 15**, as mentioned above in the discussion of claim 12, Tanida et al. in view of Mendlovic et al. teach all of the limitations of the parent claim. Additionally, Tanida et al. teaches at least one sensor pixel receives light from more than one lens of the array of lenses (figure 11, 12A, and 12B).

Regarding **claim 16**, as mentioned above in the discussion of claim 12, Tanida et al. in view of Mendlovic et al. teach all of the limitations of the parent claim. Additionally, Tanida et al. teaches that the focal plane-coding element is an apertured mask (figure 1, item 2 partition wall layer with partition layers 2a).

Regarding **claim 17**, as mentioned above in the discussion of claim 1, Tanida et al. in view of Mendlovic et al. teach all of the limitations of the parent claim. Additionally, Tanida et al. teaches that the focal plane coding element is closer to the plurality of sensor pixels than to the array of lenses (figure 8 when the array 4 is places in figure 1).

Regarding **claim 18**, as mentioned above in the discussion of claim 12, Tanida et al. in view of Mendlovic et al. teach all of the limitations of the parent claim. Additionally, Tanida et al. teaches that the focal plane coding element is between the plurality of sensor pixels than to the array of lenses (figure 8 when the array 4 is places in figure 1).

Regarding **claim 19**, as mentioned above in the discussion of claim 18, Tanida et al. in view of Mendlovic et al. teach all of the limitations of the parent claim. Additionally, Tanida et al. teaches that the focal plane coding element is closer to the plurality of sensor pixels than to the array of lenses (figure 8 when the array 4 is places in figure 1).

Regarding **claim 21**, as mentioned above in the discussion of claim 1, Tanida et al. in view of Mendlovic et al. teach all of the limitations of the parent claim. Additionally, Tanida et al. teaches that a majority of patterns of multiple pixel resolution elements are different from one another (figure 8, array 4).

However, Tanida et al. fails to teach that the pixels are sub-pixels. Mendlovic et al., on the other hand teaches that the pixels are sub-pixels.

More specifically, Mendlovic et al. teaches that that the pixels are sub-pixels (column 2 line 38 – 45, column 6 liens 47 *et seq.*, column 13 lines 3 *et seq.*, and column 14 lines 8 *et seq.*; sub-pixel).

Therefore, one of ordinary skill in the art at the time the invention was made would have been motivated to incorporate the teachings of Mendlovic et al. with the teachings of Tanida et al. because in column 2 line 27 – column 3 line26 Mendlovic et al. teaches that using the CCD configuration of the invention will improve the image quality.

Regarding **claim 22**, as mentioned above in the discussion of claim 1, Tanida et al. in view of Mendlovic et al. teach all of the limitations of the parent claim. Additionally, Tanida et al. teaches that a majority of patterns of multiple pixel resolution elements block substantially half of incident light (figure 8, array 4).

However, Tanida et al. fails to teach that the pixels are sub-pixels. Mendlovic et al., on the other hand teaches that the pixels are sub-pixels.

More specifically, Mendlovic et al. teaches that that the pixels are sub-pixels (column 2 line 38 – 45, column 6 liens 47 *et seq.*, column 13 lines 3 *et seq.*, and column 14 lines 8 *et seq.*; sub-pixel).

Therefore, one of ordinary skill in the art at the time the invention was made would have been motivated to incorporate the teachings of Mendlovic et al. with the teachings of Tanida et al. because in column 2 line 27 – column 3 line26 Mendlovic et al. teaches that using the CCD configuration of the invention will improve the image quality.

Regarding **claim 23**, as mentioned above in the discussion of claim 1, Tanida et al. in view of Mendlovic et al. teach all of the limitations of the parent claim. Additionally, Tanida et al. teaches that each pattern of multiple pixel resolution elements includes a plurality of apertures (figure 8, array 4).

However, Tanida et al. fails to teach that the pixels are sub-pixels. Mendlovic et al., on the other hand teaches that the pixels are sub-pixels.

More specifically, Mendlovic et al. teaches that that the pixels are sub-pixels (column 2 line 38 – 45, column 6 liens 47 *et seq.*, column 13 lines 3 *et seq.*, and column 14 lines 8 *et seq.*; sub-pixel).

Therefore, one of ordinary skill in the art at the time the invention was made would have been motivated to incorporate the teachings of Mendlovic et al. with the teachings of Tanida et al. because in column 2 line 27 – column 3 line26 Mendlovic et

al. teaches that using the CCD configuration of the invention will improve the image quality.

Regarding **claim 24**, as mentioned above in the discussion of claim 1, Tanida et al. in view of Mendlovic et al. teach all of the limitations of the parent claim. Additionally, Tanida et al. teaches that at least one pattern of multiple pixel resolution elements transmits substantially all incident light (figure 8 item 4, Tanida et al. teaches that some of the patterns will be transmitting all light through).

However, Tanida et al. fails to teach that the pixels are sub-pixels. Mendlovic et al., on the other hand teaches that the pixels are sub-pixels.

More specifically, Mendlovic et al. teaches that that the pixels are sub-pixels (column 2 line 38 – 45, column 6 liens 47 *et seq.*, column 13 lines 3 *et seq.*, and column 14 lines 8 *et seq.*; sub-pixel).

Therefore, one of ordinary skill in the art at the time the invention was made would have been motivated to incorporate the teachings of Mendlovic et al. with the teachings of Tanida et al. because in column 2 line 27 – column 3 line26 Mendlovic et al. teaches that using the CCD configuration of the invention will improve the image quality.

Regarding **claim 25**, as mentioned above in the discussion of claim 12, Tanida et al. in view of Mendlovic et al. teach all of the limitations of the parent claim. Additionally,

Tanida et al. teaches that a majority of patterns of multiple pixel resolution elements are different from one another (figure 8, array 4).

However, Tanida et al. fails to teach that the pixels are sub-pixels. Mendlovic et al., on the other hand teaches that the pixels are sub-pixels.

More specifically, Mendlovic et al. teaches that that the pixels are sub-pixels (column 2 line 38 – 45, column 6 liens 47 *et seq.*, column 13 lines 3 *et seq.*, and column 14 lines 8 *et seq.*; sub-pixel).

Therefore, one of ordinary skill in the art at the time the invention was made would have been motivated to incorporate the teachings of Mendlovic et al. with the teachings of Tanida et al. because in column 2 line 27 – column 3 line26 Mendlovic et al. teaches that using the CCD configuration of the invention will improve the image quality.

Regarding **claim 26**, as mentioned above in the discussion of claim 12, Tanida et al. in view of Mendlovic et al. teach all of the limitations of the parent claim. Additionally, Tanida et al. teaches that a majority of patterns of multiple pixel resolution elements block substantially half of incident light (figure 8, array 4).

However, Tanida et al. fails to teach that the pixels are sub-pixels. Mendlovic et al., on the other hand teaches that the pixels are sub-pixels.

More specifically, Mendlovic et al. teaches that that the pixels are sub-pixels (column 2 line 38 – 45, column 6 liens 47 *et seq.*, column 13 lines 3 *et seq.*, and column 14 lines 8 *et seq.*; sub-pixel).

Therefore, one of ordinary skill in the art at the time the invention was made would have been motivated to incorporate the teachings of Mendlovic et al. with the teachings of Tanida et al. because in column 2 line 27 – column 3 line26 Mendlovic et al. teaches that using the CCD configuration of the invention will improve the image quality.

Regarding **claim 27**, as mentioned above in the discussion of claim 12, Tanida et al. in view of Mendlovic et al. teach all of the limitations of the parent claim. Additionally, Tanida et al. teaches that each pattern of multiple pixel resolution elements includes a plurality of apertures (figure 8, array 4).

However, Tanida et al. fails to teach that the pixels are sub-pixels. Mendlovic et al., on the other hand teaches that the pixels are sub-pixels.

More specifically, Mendlovic et al. teaches that that the pixels are sub-pixels (column 2 line 38 – 45, column 6 liens 47 *et seq.*, column 13 lines 3 *et seq.*, and column 14 lines 8 *et seq.*; sub-pixel).

Therefore, one of ordinary skill in the art at the time the invention was made would have been motivated to incorporate the teachings of Mendlovic et al. with the teachings of Tanida et al. because in column 2 line 27 – column 3 line26 Mendlovic et al. teaches that using the CCD configuration of the invention will improve the image quality.

Regarding **claim 28**, as mentioned above in the discussion of claim 12, Tanida et al. in view of Mendlovic et al. teach all of the limitations of the parent claim. Additionally, Tanida et al. teaches that at least one pattern of multiple pixel resolution elements transmits substantially all incident light (figure 8 item 4, Tanida et al. teaches that some of the patterns will be transmitting all light through).

However, Tanida et al. fails to teach that the pixels are sub-pixels. Mendlovic et al., on the other hand teaches that the pixels are sub-pixels.

More specifically, Mendlovic et al. teaches that that the pixels are sub-pixels (column 2 line 38 – 45, column 6 liens 47 *et seq.*, column 13 lines 3 *et seq.*, and column 14 lines 8 *et seq.*; sub-pixel).

Therefore, one of ordinary skill in the art at the time the invention was made would have been motivated to incorporate the teachings of Mendlovic et al. with the teachings of Tanida et al. because in column 2 line 27 – column 3 line26 Mendlovic et al. teaches that using the CCD configuration of the invention will improve the image quality.

Regarding **claim 29**, as mentioned above in the discussion of claim 12, Tanida et al. in view of Mendlovic et al. teach all of the limitations of the parent claim. Additionally, Tanida et al. teaches wherein color filters serve as pixel resolution elements (column 11 lines 24 – 38).

However, Tanida et al. fails to teach that the pixels are sub-pixels. Mendlovic et al., on the other hand teaches that the pixels are sub-pixels.

More specifically, Mendlovic et al. teaches that that the pixels are sub-pixels (column 2 line 38 – 45, column 6 liens 47 *et seq.*, column 13 lines 3 *et seq.*, and column 14 lines 8 *et seq.*; sub-pixel).

Therefore, one of ordinary skill in the art at the time the invention was made would have been motivated to incorporate the teachings of Mendlovic et al. with the teachings of Tanida et al. because in column 2 line 27 – column 3 line26 Mendlovic et al. teaches that using the CCD configuration of the invention will improve the image quality.

Regarding **claim 36**, as mentioned above in the discussion of claim 1, Tanida et al. in view of Mendlovic et al. teach all of the limitations of the parent claim. Additionally, Tanida et al. teaches that each image blocking portion is smaller than a detector in both directions (figure 8 item 4 polarizing filter array with plurality of polarizing filters 4a; also column 6 lines 25 – 60; the plurality of filters 4a can be broken down as each filter 4a including a plurality of polarizing beam splitters).

Regarding **claim 37**, as mentioned above in the discussion of claim 36, Tanida et al. teaches all of the limitations of the parent claim. Additionally, Tanida et al. teaches that each image blocking portion in a pattern has equal dimensions in both directions (figure 8 item 4 polarizing filter array with plurality of polarizing filters 4a; also column 6 lines 25 – 60; the plurality of filters 4a can be broken down as each filter 4a including a plurality of polarizing beam splitters).

Regarding **claim 39**, as mentioned above in the discussion of claim 12, Tanida et al. in view of Mendlovic et al. teach all of the limitations of the parent claim. Additionally, Tanida et al. teaches that each image blocking portion is smaller than a detector in both directions (figure 8 item 4 polarizing filter array with plurality of polarizing filters 4a; also column 6 lines 25 – 60; the plurality of filters 4a can be broken down as each filter 4a including a plurality of polarizing beam splitters).

Regarding **claim 40**, as mentioned above in the discussion of claim 39, Tanida et al. teaches all of the limitations of the parent claim. Additionally, Tanida et al. teaches that each image blocking portion in a pattern has equal dimensions in both directions (figure 8 item 4 polarizing filter array with plurality of polarizing filters 4a; also column 6 lines 25 – 60; the plurality of filters 4a can be broken down as each filter 4a including a plurality of polarizing beam splitters).

5. Claim 5 is rejected under 35 U.S.C. 103(a) as being unpatentable over Tanida et al. (US patent No. 7,009,652) in view of Mendlovic et al. (US patent No. 7,003,177) and further in view of Bills (US patent No. 6,366,319).

Regarding **claim 5,** as mentioned above in the discussion of claim 1 Tanida et al. in view of Mendlovic et al. teach all of the limitations of the parent claim.

However, Tanida et al. in view of Mendlovic et al. fail to teach that the color filters are integral with the focal plane-coding element. Bills, on the other hand teaches that the color filter is adjoined to another element in the focal plane.

More specifically, Bills teaches that the color filter is adjoined to a focal plane array (FPA) located in the focal plane (Figures 1, 2A, 6, and 7; items 105 and 107; Also, Abstract; Also, column 2 lines 29 - 37).

Therefore, one of ordinary skill in the art at the time the invention was made would have been motivated to incorporate the teachings of Bills with the teachings of Tanida et al. in view of Mendlovic et al. because in column 2 lines 29 – 37 Bills teaches that this mosaics attempt to match the wavelength-dependent sensitivity of the human eye by including a larger percentage of green pixels than red and blue pixels which in turn will produce a more natural image. Also the combination of the color filter is adjoined to a focal plane array will produce a simpler device which will reduce size by not requiring the two components at two different sections of the camera.

6. Claims 7 and 14 are rejected under 35 U.S.C. 103(a) as being unpatentable over Tanida et al. (US patent No. 7,009,652) in view of Mendlovic et al. (US patent No. 7,003,177) and further in view of Meyers (US patent No. 6,137,535).

Regarding **claim 7,** as mentioned above in the discussion of claim 1 Tanida et al. in view of Mendlovic et al. teach all of the limitations of the parent claim.

However, Tanida et al. in view of Mendlovic et al. fail to teach a corresponding plurality of focusing lenses, a focusing lens between the focal plane encoding element

and a corresponding sensor pixel. Meyers, on the other hand teaches a corresponding plurality of focusing lenses, a focusing lens between the focal plane encoding element and a corresponding sensor pixel.

More specifically, Meyers teaches a corresponding plurality of focusing lenses, a focusing lens between the focal plane encoding element and a corresponding sensor pixel (figure 2; items 72, 10, and 24).

Therefore, one of ordinary skill in the art at the time the invention was made would have been motivated to incorporate the teachings of Meyers with the teachings of Tanida et al. in view of Mendlovic et al. because in column 3 lines 46 - 55 Meyers teaches that by use of the invention an extremely compact digital camera with a lenslet array in close proximity to a photodetector array is formed. Due to the larger sub-image size a reduced number of lenslets are needed to construct the full image. By utilizing the space between sub-groups of photodetectors for signal processing electronics, the digital camera can be formed on a single substrate. In addition, a large high-resolution sensor can be synthesized by the use of sub-groups of photodetectors.

Regarding **claim 14,** as mentioned above in the discussion of claim 12 Tanida et al. in view of Mendlovic et al. teach all of the limitations of the parent claim.

However, Tanida et al. in view of Mendlovic et al. fail to teach a corresponding plurality of focusing lenses, a focusing lens between the filter and a corresponding sensor pixel. Meyers, on the other hand teaches a corresponding plurality of focusing lenses, a focusing lens between the filter and a corresponding sensor pixel.

More specifically, Meyers teaches a corresponding plurality of focusing lenses, a focusing lens between the focal plane encoding element and a corresponding sensor pixel (figure 2; items 72, 10, and 24).

Therefore, one of ordinary skill in the art at the time the invention was made would have been motivated to incorporate the teachings of Meyers with the teachings of Tanida et al. in view of Mendlovic et al. because in column 3 lines 46 - 55 Meyers teaches that by use of the invention an extremely compact digital camera with a lenslet array in close proximity to a photodetector array is formed. Due to the larger sub-image size a reduced number of lenslets are needed to construct the full image. By utilizing the space between sub-groups of photodetectors for signal processing electronics, the digital camera can be formed on a single substrate. In addition, a large high-resolution sensor can be synthesized by the use of sub-groups of photodetectors.

7. Claims 8, 20, 35, and 38 are rejected under 35 U.S.C. 103(a) as being unpatentable over Tanida et al. (US patent No. 7,009,652) in view of Mendlovic et al. (US patent No. 7,003,177) and further in view of Official Notice.

Regarding **8 and 20**, as mentioned above in the discussion of claim 1 and 12 respectively, Tanida et al. in view of Mendlovic et al. teach all of the limitations of the parent claim. Additionally, Tanida et al. teaches that the columns and rows can be varied (column 7 lines 24 – 40)

However, Tanida et al. in view of Mendlovic et al. fails to teach that the selected transform matrix has fewer rows than columns.

The examiner takes Official Notice that it is old and well known in the art to use matrices of different sizes.

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to use a matrix with fewer rows then columns to have a wide angle image.

Regarding claims **35, and 38**, as mentioned above in the discussion of claims 1 and 12 respectively, Tanida et al. in view of Mendlovic et al. teach all of the limitations of the parent claim.

However, Tanida et al. in view of Mendlovic et al. fail to teach that the selected transform matrix is a Hadamard matrix.

The examiner takes Official Notice that it is old and well known in the art to use Hadamard matrix when capturing an image.

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to use a Hadamard matrix to correct for errors and the very same matrix which is used for deriving the transformed components of the input video signal can be used for reconverting such transformed components back into the original video signal.

8. Claims 31 is rejected under 35 U.S.C. 103(a) as being unpatentable over Tanida et al. (US patent No. 7,009,652) in view of Mendlovic et al. (US patent No. 7,003,177) and further in view of Heller et al. (US patent No. 5,355,222).

Regarding **claim 31,** as mentioned above in the discussion of claim 29 Tanida et al. in view of Mendlovic et al. teach all of the limitations of the parent claim.

However, Tanida et al. in view of Mendlovic et al. fail to teach that wherein one lens of the array of lenses has no multiple image blocking portions associated therewith. Heller et al., on the other hand teaches that wherein one lens of the array of lenses has no multiple image blocking portions associated therewith.

More specifically, Heller et al. teaches that the wherein one lens of the array of lenses has no multiple image blocking portions associated therewith (Figures 2, 4 and 8 item A(0)).

Therefore, one of ordinary skill in the art at the time the invention was made would have been motivated to incorporate the teachings of Heller et al. with the teachings of Tanida et al. in view of Mendlovic et al. because in column 2 lines 9 *et seq.* Heller et al. teaches that this method will increase sensitivity of the system.

9. Claim 32 are rejected under 35 U.S.C. 103(a) as being unpatentable over Tanida et al. (US patent No. 7,009,652) in view of Official Notice.

Regarding claim **32**, as mentioned above in the discussion of claim 30, Tanida et al. teaches all of the limitations of the parent claim.

However, Tanida et al. fails to teach that the selected transform matrix is a Hadamard matrix.

The examiner takes Official Notice that it is old and well known in the art to use Hadamard matrix when capturing an image.

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to use a Hadamard matrix to correct for errors and the very same matrix which is used for deriving the transformed components of the input video signal can be used for reconverting such transformed components back into the original video signal.

Conclusion

10. **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

11. a shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

12. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Usman Khan whose telephone number is (571) 270-1131. The examiner can normally be reached on Mon-Fri 6:45-3:15.

13. If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Jason Chan can be reached on (571) 272-3022. The fax phone

number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

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